

PATENT SPECIFICATION

338,133



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PROVISIONAL SPECIFICATION.

No. 23,888, A.D. 1929.

Improvements in or relating to the Setting of Barrelled Fasteners.

We, THE BRITISH UNITED SHOE MACHINERY COMPANY LIMITED, a British Company, registered under the Companies Acts 1862—1898, FRED RICKS, British Subject, and ERNEST HARRY SIMMS, British Subject, all of Union Works, Belgrave Road in the City of Leicester, do hereby declare the nature of this invention to be as follows:—

This invention relates to methods of and machines for setting barrelled fasteners, and is particularly but by no means exclusively concerned with machines for setting eyelets wherein the work in which the eyelets are to be set is perforated and the eyelet set in such perforation at a single operation of and at the same location in the machine.

An important object of the invention is to provide for improved and regular setting of eyelets in machines operating in the manner indicated and a feature of the invention resides in a method of setting barrelled fasteners in sheet material which comprises gripping the material positively between a pair of opposing members of size adapted to enter a fastener barrel, pushing the material (and thereby causing its perforation) over one of said members by the yet unclenched barrel end, afterwards moving the barrel through the perforation and finally clenching it.

Another feature of the invention is an eyelet setting machine comprising a setting die having an effectively rigid and imperforate extension adapted to enter a fastener barrel, an effectively imperforate eyelet nipple pin telescoping with a setting die opposing the former die and a member adapted to give yielding support to the work during the setting operation at that side of the work engaged by said former die.

The above and other objects and the several features of the invention including those above stated will become apparent from a consideration of the following description given by way of example of a convenient construction of

eyeletting machine according to the invention.

In this construction the general arrangement and operation of the machine except as hereinafter indicated is the same as in the case of the power operated machine described and illustrated in Specification No. 211,960.

In the novel construction the lower die is imperforate and has a cylindrical portion upstanding from its setting shoulder of diameter equal to the interior diameter of the eyelet barrel and of length approximating one and a half times its diameter. The top of this projection is slightly hollowed so that it has a defined and sharpened rim. Surrounding the lower die is mounted a sleeve (conveniently of interior diameter some three times the eyelet barrel diameter) normally held pressed by a spring upwardly so that the upper edge of the sleeve stands well above the level of the setting shoulder of the lower die leaving some two thirds of the cylindrical projection projecting above the top of the sleeve. When an eyelet is being set, as will be explained hereinafter, this sleeve is depressed, the limit of such depression being that the sleeve top is level with the setting shoulder.

The nipple pin in the present construction is of equal diameter throughout its length and fits closely into the eyelet barrel. Its lower end is preferably made slightly convex and it is operated by its cam to descend tightly into contact with the lower die projection so that in that position it and the projection on the lower die form an unbroken cylinder. The cams operating the nipple pin and upper die are so arranged with regard to the automatic clutch throw-out that the machine comes to a stop before either the nipple pin or die have reached their highest positions, the lower end of the pin being just within the die. When the machine is first set into operation the upper die rises relatively to the pin so that the lower end of the pin becomes

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exposed, and this occurs before the raceway is moved under the nipple pin.

In the further operation of the machine the nipple pin descends on to a workpiece resting upon the lower die projection and firmly compresses a disc of the material this action being positive except in so far as there may be inevitable spring in the actuating lever. This disc ultimately cut out of the workpiece usually adheres to the lower end of the nipple pin and is retracted by the pin when the latter rises after the eyelet setting operation has been effected. The nipple pin rises so that its lower end comes inside the upper die and the disc of material then usually adheres by its edges to the interior of the upper die. The rise given to the upper die at the beginning of the machine cycle causes the disc to be pushed out at a moment when it will not cause obstruction by falling upon the eyelet next to be inserted and will if it falls on to the work have every chance of falling elsewhere than at the point where eyeletting is to be performed in that cycle.

The operation of perforating a workpiece and setting an eyelet is performed by the mechanism above described as follows:—The workpiece is placed by the machine operator with the desired eyelet location upon the upstanding central projection of the lower die and the machine clutch tripped. As has been indicated the upper die rises slightly to free the piece punched in a previous operation. The raceway then moves so as to bring the endmost eyelet held by it under the nipple pin which latter then descends and picks off the eyelet just as

the raceway retires. The nipple pin then descends further and contacting with the workpiece presses it very forcibly against the lower die projection in so doing much reducing the thickness of the work at the part pinched in this way and thus indenting the work while not actually perforating it. The upper set now moves down and pushes the unclenched lower end of the eyelet barrel against the work close around the nipple thus pushing the work down over the projection on the lower die and causes the latter to shear through the work where it has been compressed by the nipple pin and projection. The continuing descent of the upper die causes the eyelet end to continue to push the workpiece downwardly over the projection thus tending to cause any small fibres which might be left around the hole in the workpiece to be rolled inwardly. The underside of the workpiece then contacts with the top of the sleeve and the resistance offered thereby causes the eyelet barrel to emerge from the material, guided all the time by the projection. The last portion of the descent of the top die, still pressing upon the eyelet flange, pushes the work and sleeve down until the eyelet barrel fully projected from the work reaches the clenching shoulder of the lower set and is out-turned thereby below the workpiece. The upper die and nipple then rise to their starting positions leaving the eyeletted workpiece free to be lifted off the lower die projection.

Dated this 2nd day of August, 1929.

L. P. MELLERIO,
Chartered Patent Agent,
160, Belgrave Road, Leicester,

PROVISIONAL SPECIFICATION.

No. 34,452, A.D. 1929.

Improvements in or relating to the Setting of Barrelled Fasteners.

(A communication from UNITED SHOE MACHINERY COMPANY DE FRANCE, of 5, Rue de Dunkerque, Paris, (Xe), France, a Corporation duly organised under the laws of the Republic of France).

We, THE BRITISH UNITED SHOE MACHINERY COMPANY LIMITED, a British Company, registered under the Companies Acts 1862—1898, FRED RICKS, British Subject, and ERNEST HARRY SIMMS, British Subject, all of Union Works, Belgrave Road, in the City of Leicester, do hereby declare the nature of this invention to be as follows:—

This invention relates to the setting of

barrelled fasteners, such as eyelets, in sheet material and is particularly but by no means exclusively concerned with the setting of such fasteners by machinery which at a single stroke produces at a single location both perforation of the material and setting of a fastener. In this respect the invention has common features with that described in the specification of Application for Letters Patent No. 23,888 of 1929.

An object of the present invention is to provide apparatus for performing the combined operations of punching and setting barrelled fasteners in material, which apparatus shall be capable of being

cheaply constructed and operated by human power.

The several features of the invention will become apparent from a consideration of the following description given by way of example of a preferred construction of machine according to the invention and of its mode of operation.

In this construction the machine is arranged to be operated by the foot of an operator and a frame adapted to be fixed upon a bench is provided in which two slides rectangular in cross section are guided to move vertically.

One of these slides is enclosed on three sides within the other, the inner slide carrying at its upper end a cylindrical flat-ended member of diameter equal to the interior of the barrel of the eyelet it is desired to set. This member as will be described, acts both as an eyelet-picking nipple and a work punching device. The outer slide carries an eyelet set surrounding the cylindrical member. Each of the two slides is provided with a roll, both rolls engage a cam track cut in a disc which has a hub mounted to rotate on a horizontal axis in a bearing in one side of the machine frame. The two rolls project laterally from their slides and are positioned by them on a diameter of the cam disc on opposite sides of its centre. Upon the hub of the disc is fixed a pinion which gears with a segmental gear portion upon one end of a lever pivoted in bearings on the machine frame and on a bracket attached thereto. The other end of this lever is connected to a foot pedal by the depression of which the lever may be rocked and the cam disc rotated, through its pinion. A spring coiled around the pivot of the lever tends to maintain the pedal raised and the slides lowered. The machine frame has an upwardly extending and overhanging portion carrying fixedly but adjustably mounted within it a set immediately above the punch and set carried by the slides above mentioned. This upper set has an annular concave setting surface from which centrally projects, positioned in alignment with the under punch, a complementary punching member equal in diameter to the lower punch above described. The extreme end of the upper punch is concave with a sharpened edge so that work punchings tend to remain within the concavity. For the purpose of ejecting punchings a spring pressed pin is provided within the upper punch.

Eyelets are supplied from a hopper and inclined raceway of usual type; in this construction the lower end of the raceway is arranged to be positioned so as to hold its endmost eyelet flange downwards

immediately over the upper end of the nipple pin before described when the foot pedal is raised. The raceway is mounted upon the upper ends of parallel links pivoted to the machine frame at their lower ends. One of these links has an additional arm linked in turn to the pedal-actuated lever. When the pedal is depressed the raceway is moved laterally so that its lower end passes (rearwardly, relatively to an operator standing in front of the machine) out from between the upper and lower punching members.

The raceway carries the eyelet hopper at its upper end and a brush of usual construction for agitating the eyelets in the hopper is rotated whenever the foot-pedal is depressed by a pinion upon its shaft meshing with a rack bar connected at one end to the machine frame, the movement of the raceway and hopper (produced by its connection to the pedal-actuated lever) causing the pinion on the brush shaft to move along the rack.

The operation of punching the work and setting eyelets is performed entirely by the movement of the slides by the cam above referred to. At the starting position the roll of the inner slide is within the cam track and immediately above the cam centre, the roll on the outer slide being below the centre and outside the maximum radius of the cam track which is cut away at that portion.

A workpiece is positioned with its desired punching locality under the upper punch, and depression of the pedal first brings into action a portion of the cam track which raises the inner slide, also, since the outer slide has a shoulder overlying an upper edge of the inner slide, the outer slide is thereby raised as well, bringing its roll into position to engage with the cam track. This rise of the inner slide causes the combined punch and nipple pin carried by it to pass up through the endmost eyelet on the raceway (which thereupon retires as described) and to grip the work and cause partial or even complete perforation of the latter by pressing it against the sharpened lower edge of the fixed upper punch.

Further rotation of the cam then traverses a concentric portion of the track past the roll of the inner slide so that this slide receives no further movement before the setting of the eyelet is completed, but at this same period another portion of the cam track is passing the roll of the outer slide and raising that slide to cause the set carried by it to clench the eyelet against the fixed upper set after thrusting the barrel through the workpiece (thus completing any perforation thereof not effected by the punch-

ing members) and over the fixed upper punch which projects from the upper set.

Upon the release of the pedal the parts return to their original position, the cam rotating in the reverse direction. The spring coiled on the pivot of the actuating lever produces the rotation of the cam and a further compression spring housed between the two slides (with its ends in sockets therein) ensures descent of the outer slide and the setting die carried by it to their lowest positions in readiness for another eyeletting operation.

Since the upper punch projects a substantial distance beyond the eyelet setting shoulder on the upper set, and the action of the lower set, acting against the flange of the eyelet, is primarily to push the workpiece over the upper punch, there is a tendency produced by the passage of the workpiece over the upper punch for any fibres on the workpiece to be rolled

inwardly of the hole in the workpiece. The actual moment of the passage of the eyelet barrel end through the workpiece depends both upon the thickness of the eyelet barrel end (usually it is sharp) and upon the expansibility of the material being eyeletted, but in any event as soon as the upper side of the workpiece contacts with the rim of the upper set further movement of the workpiece over the upper punch under the thrust of the eyelet is stopped, and the eyelet barrel end, if it has not already entered the workpiece then does so and emerges from its upper side, becoming then spread and set within the annular recess between the exterior of the projecting punch portion and the surrounding rim portion of the upper set.

Dated this 11th day of November, 1929.

L. P. MELLERIO,
Chartered Patent Agent,
160, Belgrave Road, Leicester,

COMPLETE SPECIFICATION.

Improvements in or relating to the Setting of Barrelled Fasteners.

(A communication in part from UNITED SHOE MACHINERY COMPANY DE FRANCE, of 5, Rue de Dunkerque, Paris (Xe), France, a Corporation duly organised under the laws of the Republic of France).

We, THE BRITISH UNITED SHOE MACHINERY COMPANY LIMITED, a British Company, registered under the Companies Acts 1862—1898, FRED RICKS, British Subject, and ERNEST HARRY SIMMS, British Subject, all of Union Works, Belgrave Road, in the City of Leicester, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to setting barrelled fasteners, particularly but by no means exclusively eyelets, in sheet material by means of machines of the type adapted to cause perforation of a workpiece of sheet material and insertion and clenching of a barrelled fastener in such perforation at one continuous operation by members all located in and operating along a single common axis, and it is to a machine of this type that reference is hereinafter made by the expression "a machine of the type characterised."

An important one amongst the several objects of the invention is to provide for improved and regular setting of eyelets

in machines operating in the manner indicated and a feature amongst the several features of the invention resides in a method of setting barrelled fasteners in sheet material which comprises gripping the material positively between a pair of opposing members of size adapted to enter a fastener barrel, pushing the material (and thereby ensuring its perforation) over one of said members by the yet unclenched barrel end, afterwards moving the barrel through the perforation and finally clenching it.

A further object of the invention is to provide apparatus for performing the setting of barrelled fasteners by the method indicated which shall be capable of being cheaply constructed and operated by human power.

The several features of the invention including that above stated will be pointed out in the appended claims but, with the above and other objects, will become apparent from a consideration of the following description given by way of example and with reference to the accompanying drawing of convenient constructions of eyeletting machines according to the invention.

In the drawings,

Figures 1 to 4 show, partly in section, four successive stages in the operation of setting an eyelet by means of punch and die members suitable for embodiment in a power operated machine of the general

nature shown in Specification No. 211,960;

Figures 5 and 6 show respectively front and side views of a device for facilitating removal of the work from the machine at the conclusion of an eyelet setting operation;

Figures 7 to 10 show an alternative construction of machine according to the invention, of these

Figure 7 shows a side view of the machine,

Figure 8 shows, partly in section, a front view of the same,

Figure 9 shows a plan view, the eyelet hopper and raceway being omitted in Figures 8 and 9; and

Figure 10 shows a detail of eyelet raceway detent mechanism of the machine shown in Figures 7 to 9.

In the construction shown in Figures 1 to 4, an upper setting die 4 of usual construction is arranged to be reciprocated by a cam and lever in the manner shown in the Specification referred to above, and a nipple pin 6 is also separately reciprocated by another cam and lever. The under setting die 8 which cooperates with the upper die 4 to set the eyelets is mounted in a fixed arm 7 of the machine, being capable of vertical adjustment by means of a screw 11 which engages the lower end of the die stem. The die 8 is imperforate and has a cylindrical portion 10 upstanding from its setting shoulder 12 of diameter equal to the interior diameter of the eyelet barrel and of length approximating one and a half times its diameter. The top of this projection is slightly hollowed so that it has a defined and sharpened rim 14. Surrounding the lower die 8 is mounted a sleeve 16 (conveniently of interior diameter some three times the eyelet barrel diameter) normally held pressed by a spring 18 upwardly so that the upper edge of the sleeve stands well above the level of the setting shoulder 12 of the lower die, leaving some two thirds of the cylindrical projection projecting above the top of the sleeve. When an eyelet is being set, as will be explained hereinafter (Figures 3 and 4), this sleeve 16 is depressed, the limit of such depression being that the sleeve top is level with the setting shoulder 12.

The nipple pin 6 is in the present construction of equal diameter throughout its length and fits closely into the eyelet barrel. Its lower end is preferably made slightly convex as shown and it is operated by its cam to descend tightly into contact (when there is no workpiece in the machine) with the lower die projection 10 so that in that position it and the

projection on the lower die form for practical purposes an unbroken cylinder. The cams operating the nipple pin and upper die 4 are so arranged with regard to the automatic clutch throw-out (also described in the specification referred to) that the machine comes to a stop before either the nipple pin or die have reached their highest positions, the lower end of the pin 6 being just within the die. When the machine is first set into operation the upper die 4 rises relatively to the pin 6 so that the lower end of the pin becomes exposed, and this occurs before the raceway (which is moved so that its lower end reciprocates horizontally as in the machine described in the specification referred to) is moved under the nipple pin.

In the further operation of the machine the nipple pin 6 descends on to a workpiece 20 which will have been placed above the lower die projection 10, and firmly compresses a disc of the material, this action being positive except in so far as there may be inevitable spring in the actuating lever. This disc, ultimately cut out of the workpiece, usually adheres to the lower end of the nipple pin 6 and in such event is retracted by the pin when the latter rises after the eyelet setting operation has been effected. The nipple pin rises during the conclusion of a cycle of operations to such an extent that its lower end comes inside the upper die 4 and the disc of material then usually adheres by its edges to the interior of the upper die. The rise given as above indicated to the upper die at the beginning of the machine cycle causes the disc to be pushed out at a moment when it will not cause obstruction by falling upon the eyelet next to be inserted and will, if it falls on to the work, have every chance of falling elsewhere than at the point where eyeletting is to be performed in that cycle.

The operation of perforating a workpiece and setting an eyelet is performed by the mechanism above described as follows:—The workpiece 20 is placed by the machine operator with the desired eyelet location immediately above the upstanding projection 10 of the lower die and the machine clutch is then tripped. As has been indicated the upper die rises slightly to free the piece punched in a previous operation. The raceway then moves in the manner usual in eyeletting machines and as described in Specification No. 211,960 so as to bring the endmost eyelet held by it under the nipple pin 6 which latter then descends and picks off the eyelet 22 by passing through its barrel, just as the raceway retires. The nipple pin 6 then descends further and

contacting with the workpiece presses it very forcibly against the lower die projection 10 in so doing much reducing the thickness of the work at the part pinched in this way and thus indenting the work while not actually perforating it. This condition of affairs is shown in Figure 1. The upper set 4 now moves down and pushes the unclenched lower end of the eyelet barrel against the work close around the nipple pin, thus pushing the work down over the projection 10 and causing the latter to shear through the work where it has been compressed by the nipple pin and projection. Figure 2 shows the eyelet barrel end thus pushing the work. The continuing descent of the upper die 4 causes the eyelet barrel end to continue to push the workpiece 20 downwardly over the projection thus tending to cause small fibres which might be left around the hole in the workpiece to be rolled inwardly. The underside of the workpiece then contacts with the top of the sleeve 16 and the resistance offered thereby causes the eyelet barrel to emerge from the material, guided all the time by the projection. Figure 3 shows the parts at this stage. The last portion of the descent of the upper die 4, still pressing upon the flange of the eyelet, pushes the work 20 and sleeve 16 down until the eyelet barrel, fully projected from the work, reaches the clenching shoulder 12 of the lower setting die 8 and is outturned thereby below the workpiece as shown in Figure 4.

The upper die and nipple then rise to their starting positions leaving the eyeletted workpiece free to be lifted off the lower die projection. In practice it sometimes occurs that to lift the eyeletted work off the projection imposes a separate movement (otherwise not required) of the work upon the operator of the machine. The device shown in Figures 5 and 6 tends to facilitate automatic movement of the workpiece to free the eyelet from the projection. The device takes the form of a flat metal spring 24 clamped by a screw 26 to the front of the lower arm 7 with the free end of a horizontal portion of the spring cut out as indicated by the dotted line 28 to surround the projection 10. This device acts, as the upper die 4 and nipple pin 6 retire upwardly after setting an eyelet, to lift the work 20 off the projection 10. During the operation of eyeletting the spring 24 yields downwardly with the work resting upon it.

In the construction shown in Figures 7 to 10 inclusive the machine is arranged to be operated by the foot of an operator and a frame 30 adapted to be fixed upon

a bench is provided in which two slides 32 and 34, rectangular in cross section, are guided to move vertically.

One of these slides, 32, is enclosed on three sides within the other 34, the inner slide 32 carrying at its upper end a cylindrical flat-ended member 36 of diameter equal to the interior of the barrel of the eyelet it is desired to set. The member 36 as will be described, acts both as an eyelet-picking nipple and a work punching device. The outer slide 34 carries an eyelet set 38 surrounding the member 36. Each of the two slides 32, 34 is provided with a roll. These rolls are designated 40 and 42 respectively. Both rolls engage a cam track 44 cut in a disc 46 which has a hub 48 mounted to rotate on a horizontal axis in a bearing 50 in one side of the machine frame. The rolls 40 and 42 project laterally from their slides and are positioned by them on a diameter of the cam disc 46 on opposite sides of its centre. Upon the hub 48 is fixed by a key 51 a pinion 52 which gears with a segmental gear portion 54 upon one end of a lever 56 pivoted in bearings 58, 60 on the machine frame and on a bracket 62 attached thereto. The other end of the lever 56 is connected to a foot pedal (not shown) by a rod 64. By depression of the pedal the lever 56 may be rocked and the cam disc 46 rotated, through the pinion 52. A spring 66 coiled around the pivot of the lever 56 tends to maintain the pedal and lever 56 raised (with the latter contacting with a stop 57) and the slides 32, 34 lowered. The machine frame 30 has an upwardly extending and overhanging portion 70 carrying fixedly but adjustably mounted within it a setting die 72 immediately above the member 36 and set 38 carried by the slides 32, 34. The upper die 72 has an annular concave setting surface 74 from which centrally projects, positioned in alignment with the punch member 36, a complementary punching member 76 equal in diameter to the punch 36. The extreme end of the punch 76 is concave with a sharpened edge so that work punchings tend to remain within the concavity. For the purpose of ejecting punchings a pin 78 pressed by a spring 80 (Figure 8) is provided within the punch 76. When a workpiece is gripped between the upper and lower punches the spring 80 is compressed. As soon as the work is released at the conclusion of an eyelet setting operation the spring 80 acting upon the pin 78 ejects the punching.

Eyelets are supplied from a hopper 82 (Figure 7) and inclined raceway 84 of usual type; in this construction the lower end of the raceway 84 is arranged to be

positioned so as to hold its endmost eyelet flange downwards immediately over the upper end of the punch or nipple pin 36 when the rod 64 is raised. The raceway 84 is mounted upon the upper ends of parallel links 86, 88 pivoted to the machine frame at their lower ends. One of these links 86 has an additional arm 87 linked in turn by a link 89 to the lever 56. When the rod 64 is depressed the raceway 84 is moved laterally so that its lower end passes (rearwardly relatively to an operator standing in front of the machine, that is it passes to the right hand side of Figure 7) out from between the upper and lower punching members 76 and 36.

The raceway 84 carries the eyelet hopper 82 at its upper end and a brush of usual construction (not shown) for agitating the eyelets in the hopper is rotated whenever the rod 64 is depressed by a pinion 90 upon its shaft 91 meshing with a rack bar 92 connected at one end at 93 to the machine frame. The movement of the raceway and hopper (produced by their connection to the lever 56) causes the pinion 90 to move along the rack 92.

The row of eyelets are maintained in the raceway by a detent shown in Figure 10, this detent taking the form of a lever 94 pivoted on the raceway at 95 and having a spring 96 backing one end of it so as to maintain normally its point 97 in position to retain the last eyelet. The raceway is retracted after the nipple pin 36 has passed through the eyelet thus detained with the result that the point 97 is pushed back, against the spring 96, as the raceway retires.

The operation of punching the work and setting eyelets is performed entirely by the movement of the slides 32, 34 by the cam track 44. At the starting position shown in Figures 7 and 8 the roll 40 of the inner slide 32 is within the cam track and immediately above the cam centre, the roll 42 on the outer slide 34 being below the centre and outside the maximum radius of the cam track the outer surface of which is cut away at that portion.

A workpiece is positioned with its desired punching locality under the upper punch, and depression of the lever 56 first brings into action a portion of the cam track (a to b Figure 7) which raises the inner slide 32, also, since the outer slide 34 has a shoulder 35 overlying an upper edge of the inner slide 32, the outer slide 34 is thereby raised as well, bringing the roll 42 into position to engage with the cam track. This rise of the inner slide 32 causes the combined punch and nipple pin 36 to pass up through the endmost eyelet on the raceway (which

thereupon retires as described) and to grip the work and cause partial or even complete perforation of the latter by pressing it against the sharpened lower edge of the fixed upper punch 76.

Further rotation of the cam track 44 then traverses a concentric portion (b to c) of the track past the roll 40 of the inner slide so that this slide receives no further movement before the setting of the eyelet is completed, but at this same period another portion of the cam track (c to f) is passing the roll 42 of the outer slide and raising that slide to cause the set 38 to clench the eyelet against the fixed upper set 72 after thrusting the barrel through the workpiece (thus completing any perforation thereof not effected by the punching members) and over the fixed upper punch 76 which projects from the set 72.

Upon the release of the rod 64 the parts return to their original position, the cam track 44 rotating in the reverse direction. The spring 66 coiled on the pivot of the lever 56 produces the rotation of the cam and a further compression spring 37 housed between the two slides (with its ends in sockets therein) ensures descent of the outer slide 34 and the setting die 38 to their lowest positions in readiness for another eyeletting operation.

Since the upper punch 76 projects a substantial distance beyond the eyelet setting shoulder 74 on the upper set, and the action of the lower set 38, acting against the flange of the eyelet, is primarily to push the workpiece over the upper punch, there is a tendency produced by the passage of the workpiece over the upper punch for fibres on the workpiece to be rolled inwardly of the hole in the workpiece. The actual moment of the passage of the eyelet barrel end through the workpiece depends both upon the thickness of the eyelet barrel end (usually it is sharp) and upon the expansibility of the material being eyeletted, but in any event as soon as the upper side of the workpiece contacts with the rim of the upper set 72 further movement of the workpiece over the upper punch 76 under the thrust of the eyelet is stopped, and the eyelet barrel end, if it has not already entered the workpiece then does so and emerges from its upper side, becoming then spread and set within the annular recess or concave surface 74 between the exterior of the projecting punch portion 76 and the surrounding rim portion of the upper set 72.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we

claim is:—

1. A method of setting barrelled fasteners in sheet material by machines of the type characterized which comprises gripping the material positively between a pair of opposing members of size adapted to enter a fastener barrel, pushing the material (and thereby ensuring its perforation) over one of said members by the yet unclenched barrel end, afterwards moving the barrel through the perforation and finally clenching it.

2. A machine of the type characterized and having a pair of mutually opposing and effectively imperforate workpiece engaging members of similar diameter and of size adapted to enter a fastener barrel, which members are arranged to grip between them the portion of the workpiece which is to be removed for reception of the fastener barrel and a further member adapted by pushing upon the fastener to force the workpiece over one of said pair of members thereby separating the workpiece from the portion gripped.

3. A machine of the type characterized and having besides opposing members of size adapted to enter a fastener barrel and arranged to grip a workpiece between them, a member arranged to support the workpiece so gripped while a fastener barrel (pushing the workpiece over one of said opposing members) is pushed there-through and thereafter to retire from such supporting position whilst the fastener barrel is being clenched.

4. A machine of the type characterised and having besides opposing members of size adapted to enter a fastener barrel and arranged to grip a workpiece between them, a further member arranged co-axially with one of the opposing members and assisting in the clenching of the fastener after its barrel has been pushed against the workpiece to separate it from the portion gripped, the said two co-axial members being operated to move separately by a single cam track.

5. A machine according to Claim No. 4 in which the cam track is partially open

and the operating member of one of the cam operated members is brought to position to be operated upon by the track by movement borrowed from the other member.

6. A machine according to any one of Claims Nos. 2 to 5 and having devices arranged to cause removal at the conclusion of a fastener inserting operation of a punched piece of material that may cling to one of the work gripping members.

7. A machine according to Claim No. 6 wherein the punched piece of material is removed from a work gripping member by means of a spring pressed nipple pin arranged for telescopic movement with such gripping member.

8. A machine according to Claim No. 6 wherein the punched piece of material is removed from a work gripping member by relative movement of the latter and a fastener setting member arranged for telescopic movement therewith.

9. A machine according to Claim No. 3 wherein the work supporting member takes the form of a spring pressed sleeve surrounding a fastener setting member.

10. A machine according to any one of Claims Nos. 2, 3 or 6 and having means for removing, from one of the workpiece engaging members at the conclusion of a fastener inserting operation, the workpiece with a fastener set in it.

11. A machine according to Claim No. 2 and having workpiece perforating and fastener setting devices constructed, arranged and adapted to operate substantially as described with reference to Figures 1 to 4 inclusive of the accompanying drawings.

12. A machine according to Claim No. 2 and constructed, arranged and adapted to operate substantially as described with reference to Figures 7, 8 and 9 of the accompanying drawings.

Dated this 2nd day of May, 1930.

L. P. MELLERIO,
Chartered Patent Agent,
160, Belgrave Road, Leicester.

[This Drawing is a reproduction of the Original on a reduced scale.]

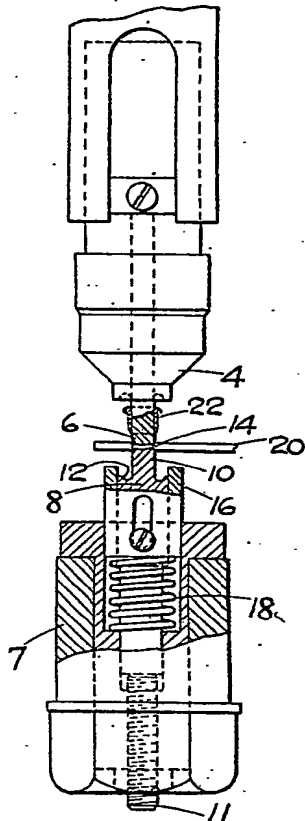


FIG. 1

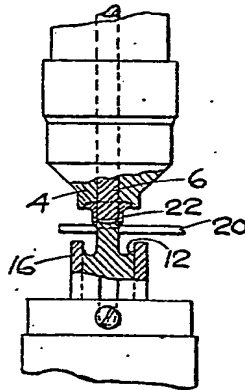


FIG. 2

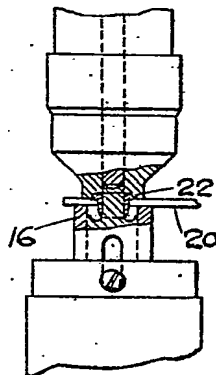


FIG. 3

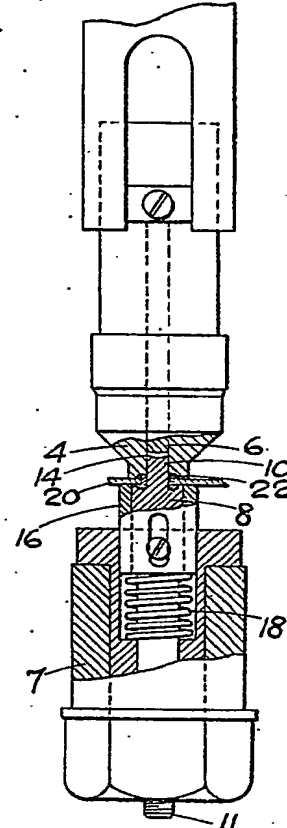


FIG. 4

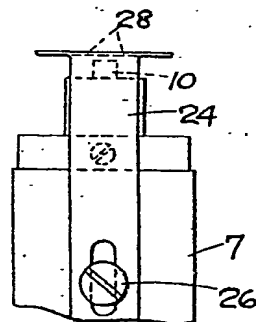


FIG. 5

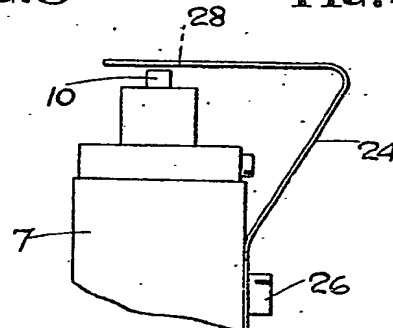


FIG. 6

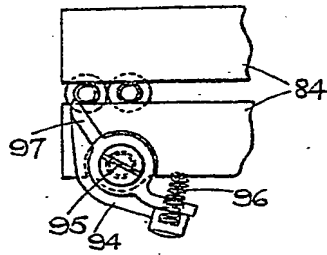


FIG. 10

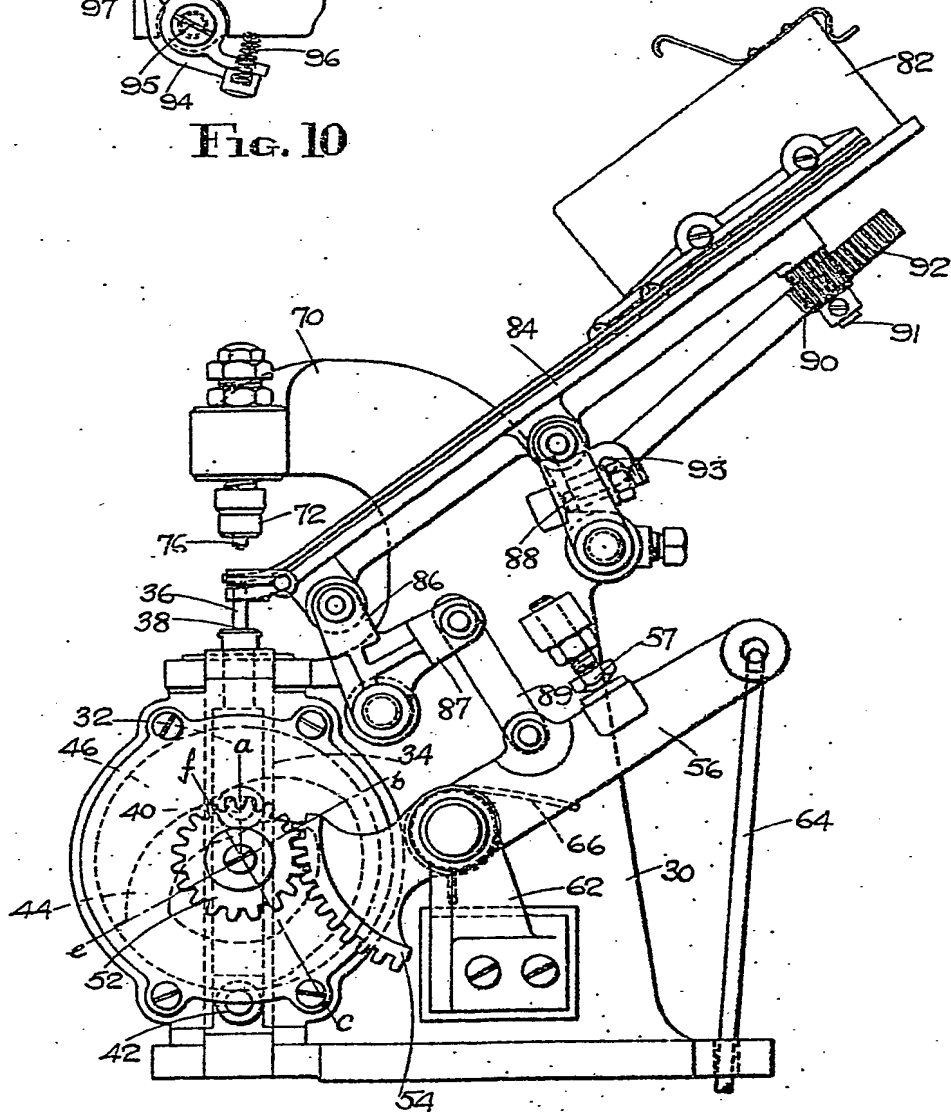


FIG. 7

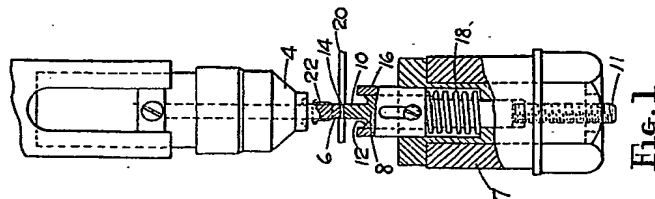


Fig. 1

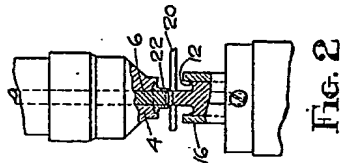


Fig. 2

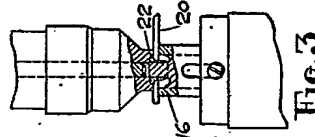


Fig. 3

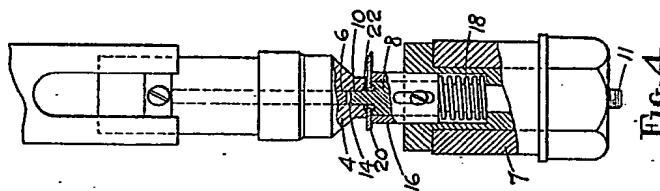


Fig. 4

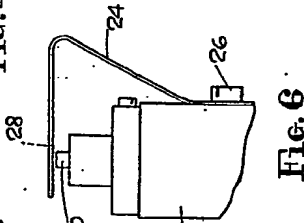


Fig. 5

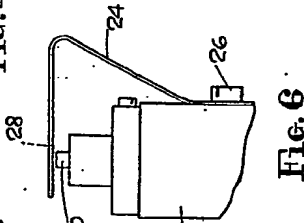


Fig. 6

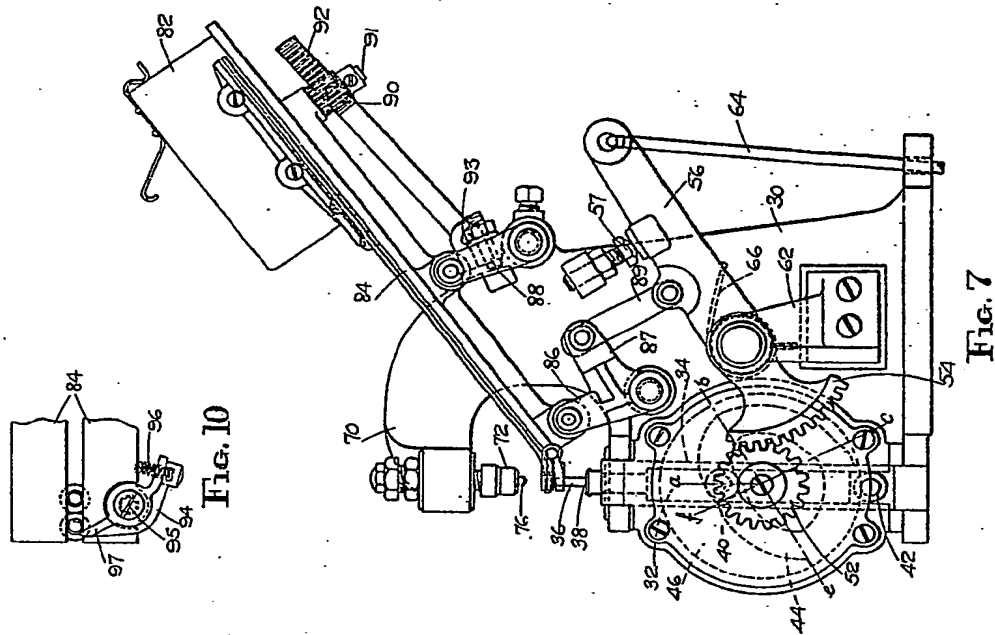


Fig. 7

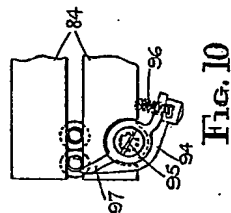


Fig. 10

[This Drawing is a reproduction of the Original on a reduced scale]

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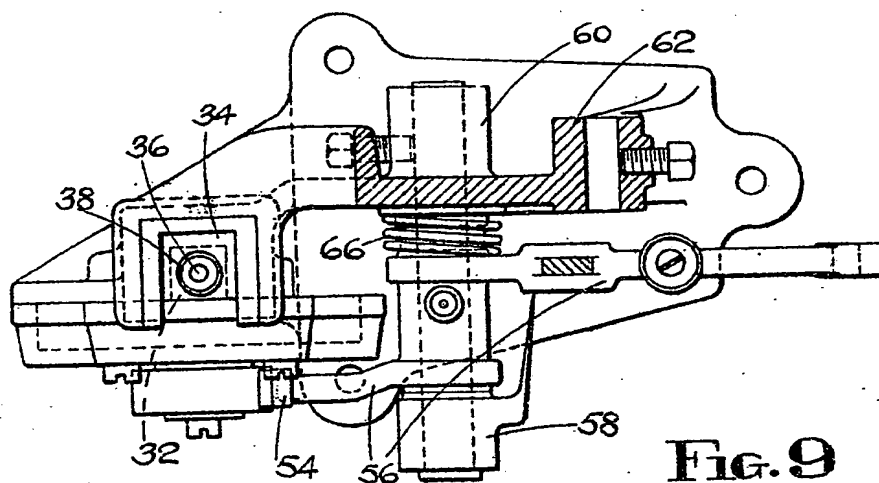


FIG. 9

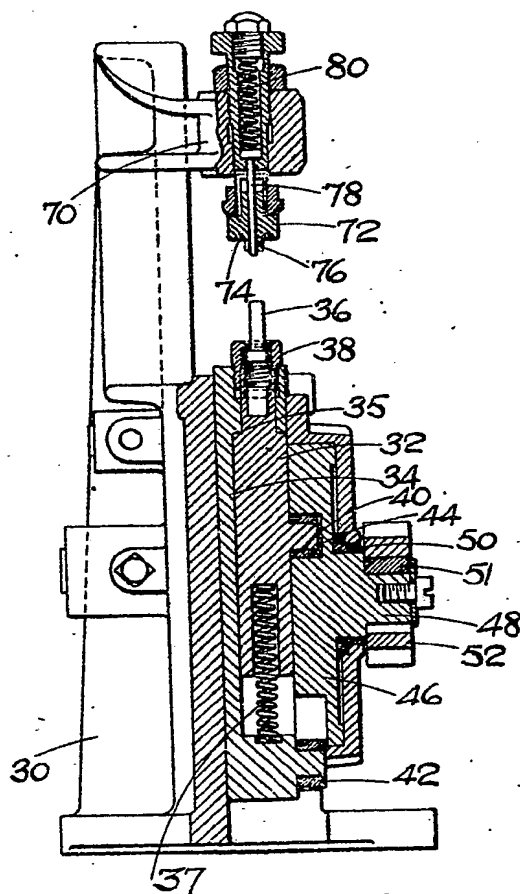


FIG. 8